

Application No.: 10/026,171  
 Response dated: February 23, 2006  
 Reply to Office Action of June 3, 2005

This listing and amendment of the claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method for preparing a supported catalyst composition system comprising:

(a) first heating a composition comprising a metallocene catalyst compound and an activator to a temperature of from 75°C to 125°C, wherein said metallocene catalyst compound is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraenyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrolyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof, independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium. Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium and tin atom or a combination thereof, wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof,  
 and

(b) then combining the heated resulting composition of step (a) with a carrier

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3. (Previously Presented) The method of claim 1 wherein in step (a) the composition is heated to a temperature in the range of from 75°C to 100°C, ~~and wherein said composition comprises said metallocene catalyst compound and an activator.~~

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5. (Currently Amended) The method of claim 3 wherein the metallocene catalyst compound has a solubility less than 20 weight percent of metallocene catalyst compound in toluene at 25°C, and ~~wherein said activator is selected from one of alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof.~~
6. (Currently Amended) A method for making a supported catalyst composition comprising:
  - (a) first forming a reaction product comprising a metallocene catalyst compound and an activator;
  - (b) second heating the reaction product to a temperature of from 60°C to 125°C;
  - ~~(c) then introducing a carrier, optionally heating the carrier;~~
  - (d) ~~(c)~~ combining the heated resulting composition of steps (a) and (b) reaction product with the a carrier or the optionally heated carrier wherein said metallocene catalyst compound is described by the formula:



wherein L<sup>A</sup> and L<sup>B</sup> are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrozoyl ligands, carbazoyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each L<sup>A</sup> and L<sup>B</sup> is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium and tin atom or a

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combination thereof, and wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof.

7. (Original) The method of claim 6 wherein the reaction product is heated to a temperature in the range from 75°C to 100°C.
8. (Currently Amended) A method for making a supported catalyst composition comprising:
- (a) a first step consisting essentially of heating an activated metallocene catalyst product to a temperature of from 60°C to 125°C;
  - ~~(b) a second step comprising heating a carrier; and~~
  - (e) (b) a third second step comprising combining the heated a carrier and with the heated activated metallocene catalyst product of step (a)
- wherein said metallocene catalyst is described by the formula:



wherein L<sup>A</sup> and L<sup>B</sup> are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrozolyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof, independently, each L<sup>A</sup> and L<sup>B</sup> is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, O is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium and tin atom or a combination thereof, and said activated metallocene catalyst product further comprising an activator, wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof.

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9. (Currently Amended) The method of claim 8 wherein the activated metallocene catalyst ~~product~~ is heated to a temperature of from 75°C to 100°C and ~~wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof.~~
10. (Currently Amended) A method for preparing a supported catalyst composition comprising:
- (a) a first step consisting essentially of heating a composition comprising a metallocene catalyst compound and an activator to a first temperature, wherein the first temperature is in the range of from 60°C to 110°C; and
  - ~~(b) a subsequent step comprising heating a carrier at a second temperature; and~~
  - (e b) a subsequent step comprising combining said metallocene catalyst composition of step (a), and said a carrier, at a third temperature wherein said metallocene catalyst compound is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrozolyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium and tin atom or a combination thereof, and wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof.

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13. (Cancelled)
14. (Currently Amended) A method for preparing a supported catalyst composition comprising:
  - (a) forming a catalyst system consisting essentially of a metallocene catalyst compound and an activator at a temperature in the range of from 60 °C to 125°C; and
  - (b) subsequently introducing a further component comprising a carrier to a reaction product formed in step (a)

wherein said metallocene catalyst compound is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrozoyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium and tin atom or a combination thereof, and wherein said activator is an alumoxane, a modified alumoxane, ionizing activators, neutral or ionic, or combinations thereof.

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15. (Original) The method of claim 14 wherein the supported catalyst composition is dried or substantially dried to a free flowing powder composition.
16. (Original) The method of claim 15 wherein the free flowing composition is reslurried in a liquid.
17. (Original) The method of claim 16 wherein the liquid is mineral oil.
18. (Previously Presented) The method of claim 14 wherein the metallocene catalyst compound and activator are combined at a temperature of from 60 °C to 110°C.
19. (Previously Presented) The method of claim 14 wherein the metallocene catalyst compound and activator are combined at a temperature of from 60°C to 100°C.
20. (Previously Presented) The method of claim 14 wherein the metallocene catalyst compound and activator are combined at a temperature of from 75°C to 100°C.
21. (Currently Amended) A method for preparing a supported catalyst composition comprising:
  - a) combining a metallocene catalyst compound and an activator at a temperature in the range of from 60°C to 110°C; and
  - b) introducing a carrier to a reaction product formed in step (a)

wherein said metallocene catalyst compound is described by the formula:



wherein L<sup>A</sup> and L<sup>B</sup> are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrozoly ligands,

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carbazolyl ligands and borabenzene ligands, including hydrogenated versions thereof, independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium and tin atom or a combination thereof, and wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof.

22. (Previously Presented) The method of claim 21, wherein the metallocene catalyst compound and activator are combined at a temperature of from 75°C to 100°C.
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24. (Currently Amended) The method of claim 21-23, wherein  $L^A$  and  $L^B$  are tetrahydroindenyl ligands; A is represented by a member of the group consisting of  $R'_2C$ ,  $R'_2Si$ ,  $R'_2SiR'_2Si$ ,  $R'_2Ge$ , and  $R'_2P$ , where each  $R'$  is independently, a hydride, hydrocarbyl, substituted hydrocarbyl, halocarbyl, substituted halocarbyl, hydrocarbyl-substituted organometalloid, halocarbyl-substituted organometalloid, disubstituted boron, disubstituted pnictogen, substituted chalcogen, or halogen or two or more  $R'$  may be joined to form a ring or ring system, and wherein said Q is selected from the group consisting of hydrocarbyl radicals having from 1 to 20 carbon atoms, and halogens.
25. (Previously Presented) The method of claim 24, wherein said A is  $R'_2Si$ , where  $R'$  is hydrocarbyl; and M is zirconium.
26. (Currently Amended) The method of claim 1, wherein said metallocene catalyst compound is one of dimethylsilyl-bis (tetrahydroindenyl) zirconium dichloride or

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dimethylsilyl-bis (tetrahydroindenyl) zirconium difluoride, ~~said catalyst composition further comprising an activator, wherein said activator is selected from one of alumoxane, modified alumoxane, ionizing activators, neutral or ionic, or combinations thereof.~~

27. (Currently Amended) A method for making a supported catalyst composition comprising:
- a) first forming a reaction product ~~comprising~~ formed from a metallocene catalyst compound and an activator, wherein said metallocene catalyst compound comprises one of dimethylsilyl-bis(tetrahydroindenyl) zirconium dichloride or dimethylsilyl-bis(tetrahydroindenyl) zirconium difluoride;
  - b) second heating the reaction product to a temperature of from 60°C to 125°C;
  - c) then introducing a carrier to said reaction product of steps (a) and (b). ~~optionally heating the carrier;~~
  - d) combining the heated reaction product with the carrier ~~or optionally the heated carrier~~  
and wherein said activator is an alumoxane, a modified alumoxane, ionizing activators, neutral or ionic, or combinations thereof.
28. (Currently Amended) A method for making a supported catalyst composition comprising:
- a) first forming a reaction product comprising a metallocene catalyst compound and an activator, wherein said metallocene catalyst compound consists essentially of one of dimethylsilyl-bis(tetrahydroindenyl) zirconium dichloride, dimethylsilyl-bis(tetrahydroindenyl) zirconium difluoride;<sub>1</sub>
  - b) second heating the reaction product to a temperature of from 60°C to 125°C; and
  - c) then introducing a carrier, to said reaction product of steps (a) and (b) ~~optionally heating the carrier;~~

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~~d) combining the heated reaction product with the carrier or optionally the heated carrier~~

and wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof.

29. (Currently Amended) A method for making a supported catalyst composition comprising:
- a) first forming a reaction product consisting essentially of methyl alumoxane and one of dimethylsilyl-bis(tetrahydroindenyl) zirconium dichloride or dimethylsilyl-bis(tetrahydroindenyl) zirconium difluoride;
  - b) second heating the reaction product, to a temperature consisting essentially of from 60°C to 125°C;
  - c) then introducing a carrier to said reaction product of steps (a) and (b), optionally heating the carrier;
  - d) combining the heated reaction product with the carrier ~~or the heated carrier.~~

30. (Currently Amended) A method for making a supported catalyst composition, comprising:
- (a) first heating a composition comprising an activated metallocene catalyst compound to a temperature of from 65°C to 125°C  
wherein said metallocene catalyst compound is described by the formula:



wherein L<sup>A</sup> and L<sup>B</sup> are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrozolyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof.

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independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium. Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium and tin atom or a combination thereof, and further comprising an activator, said activated metallocene catalyst compound further comprising an activator, wherein said activator is an alumoxane, a modified alumoxane, ionizing activators, neutral or ionic, or combinations thereof

and

- (b) then combining said composition of (a) with a carrier, said carrier being at a temperature of 30- 75°C, to form said supported catalyst composition

31. (Previously Presented) The method of claim 30, wherein said heating of said activated metallocene catalyst compound is from 68-100°C.
32. (Previously Presented) The method of claim 30, wherein said heating of said activated metallocene catalyst compound is from 75-100°C.
35. (Previously Presented) The method of claim 30 wherein said method further comprises: after a) and b) , (c) then drying said supported catalyst composition at a temperature of from 65°C-75°C.
34. (Currently Amended) A method for making a supported catalyst composition, comprising:
- (a) first forming a reaction product comprising of a metallocene catalyst compound and an activator, wherein said metallocene catalyst compound

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- comprises one of dimethylsilyl-bis(tetrahydroindenyl) zirconium dichloride or dimethylsilyl-bis(tetrahydroindenyl) zirconium difluoride;
- b) second heating the reaction product to a temperature of from 65°C to 75°C;
  - (b) then combining said reaction product composition of (a) and (b) with a carrier, said carrier heated to 65-75°C, to form said supported catalyst composition.

35. (Currently Amended) A method for making a supported catalyst composition, comprising:

- (a) first forming a reaction product of an activator and a metallocene catalyst compound, then heating said reaction product to a temperature of from 65°C to 75°C;

wherein said metallocene catalyst compound is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraenyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrozoyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium and tin atom or a combination thereof, and wherein

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said activator is an alumoxane; a modified alumoxane; ionizing activators,  
neutral or ionic; or combinations thereof

and

- (b) then combining said reaction product of (a) with a carrier, said carrier heated to 30-75°C, to form said supported catalyst composition; and
- (c) then drying said supported catalyst composition at a temperature of from 65°C-75°C